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**Business Gateway
Stellent Assessment**

July 25, 2005

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1 About this document

The findings expressed in this document address the ability of the Stellent web content management system to meet the needs of the Business Gateway (www.business.gov). The capabilities of Stellent were matched against very specific functional requirements and use cases tailored to the Business Gateway by Welchman Consulting and demonstrated by Stellent in a day-long session on July 20, 2005.

The product demonstration was assessed by Welchman Consulting and Tony Byrne of CMS Watch, third-party consultants hired by Small Business Administration to administer an objective review of Stellent capabilities. The product demonstrated was version 7.5, which was released July 2005.

2 Executive Summary

The implementation of a web content management system (CMS) is a significant investment for any organization and requires careful consideration. As the Business Gateway grows, the Governance Board is moving forward with the selection of a more-advanced content management system as planned. The general business requirements for the new CMS include support for improvements in the following functional areas:

- content delivery to improve citizen-focused service
- workflow and collaboration between agencies to minimize production time and effort
- access security to meet Federal requirements
- sustainable/scalable platform to support growth
- detailed reporting for ongoing analysis

In addition to meeting these broad business goals, the Stellent team was asked to demonstrate product capabilities against specific use cases and functional requirements that relate directly to the day-to-day operations of the Business Gateway web site. The functional requirements and use cases were crafted based on stakeholder interviews with all twenty-three partner agencies and end-user input from focus groups. The full set of requirements are detailed in the *Business Gateway Content Management Functional Requirements* document.

Stellent met most of the functional requirements and, in most cases, where there was a deficit of functionality, demonstrated or outlined their approach to closing the requirements gap through a reasonable degree of customization. Of course, the devil is in the details, and we would refrain from estimating final development effort until a recommended prototyping phase is complete.

Below are key issues which arose during the assessment process:

- A complete solution will likely require multiple Stellent products, including the core Content Server, Site Studio, and either Content Publisher or Site Studio Publisher, or both. It is not clear whether SBA already has suitable licenses for these products.
- Any existing licenses and installations would need to be upgraded to Stellent V7.5 -- the current version, just released.
- As with any CMS product, customization will be required. Due to the specialized nature of Stellent (again, not unusual), SBA will need to avail itself of architects and developers with deep experience in the Stellent platform, either from Stellent professional services and/or an integrator with strong Stellent facility and knowledge of the latest release.
- The level of effort required for customization is unknown and should be validated with Stellent and any systems integrator.
- The real usability of the product for partner agency contributors is unknown and should be tested through a Stellent prototyping exercise with a representative sampling of non-SBA authors.

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- The product's integration path with portal software is unusual and may be prohibitively complex or expensive.

3 Use Case Results

3.1 Creating Internal and External Links

Use Case

As a Federal Portal, one of the base-line requirements of the Business Gateway is the ability for partner agencies to contribute links to the site. Specific requirements include providing log-in access for content contributors. Once logged in to a web-based application, the CMS user would click on an option to submit a URL to business.gov. The user would view a form-based interface that prompts them to enter a URL and complete required fields such as “Link Title,” “Link Description” in addition to selecting metadata to describe the link content.

Out of the Box Functionality

Once Stellent is configured, content contributors will be able to log into the system and access a form for publishing links. To create a brand new link, the user would open a “submit a new URL” form. There the user is likely to see a simple web-based form that prompts the user to name the link, cut and paste the URL and write a brief description. Users may also select pre-defined metadata such as topics or industry. Additionally the system can automatically capture implicit metadata such as the author, date and time based on the user login information.

The user completes the required form fields then clicks submit. The system out of the box does not check to see if the content already exists. The submit action triggers the appropriate work-flow, which routes the content to be approved and finally published to the site.

Once a link is live on the site, the CMS user may also log back into the system and search for the piece of content using the built-in Verity search. When the content is retrieved, the user can then make text edits to the link or even remove it from the public site.

The Stellent system includes an automatic audit trail, which will allow managers to view the sequence of events related to a piece of content and even roll back to a previous version if needed.

Required Customization

While all of the above capabilities are standard in Stellent v7.5, there is some customization required. This version of Stellent has a “form creator” wizard that, theoretically, allows a non-technical person to create custom forms. In practice, creating new input forms this will likely require a junior developer.

A more substantial customization involves the all-important link-classification interface. Because Stellent's metadata model (like Vignette and others) follows a relational, rather than hierarchical model, the product does not natively support tree-based category-selection interfaces. Therefore, customization will be required to allow contributors and managers to view multiple content “folders” and click to expand

them as they drill deeper into the taxonomy to assign categories to link items. Moreover, BG will want to build in multiple cycles of user testing and validation here.

Use of metadata for dynamic publishing will also require custom programming. For example content on Business Gateway should automatically pull in related links from Forms.gov. To do this involves utilizing standard vocabularies across the two sites, but may also involve programming queries to look up content objects on the Forms.gov repository.

The ability to check for duplicate link items at authoring-time is also not native to Stellent and would require customized scripting. Moreover, Stellent does not possess an automatic link-checker for external links, and therefore, any external link checker would need to be integrated into the system if broken links are to automatically kick off any repair workflows.

3.2 Reviewing and Publishing a Link Submitted by a Content Contributor

Use Case

Within the Business Gateway production model, there are two key roles. The first is the Content Contributor, described in section 3.1. Their role is primarily centered around creating and submitting content/links into the CMS. The second key role is the Content Reviewer, who is responsible for viewing and editing content before it is published to the production server.

Out of the Box Functionality

Stellent v7.5 comes with the ability to assign roles and permissions to different users. Therefore it will support a production model where there are multiple levels of contributors and reviewers. In this scenario, a Content Manager will be able to log into the system and view a summary page that lists all pending items in their workflow. The Content Manager may then click on any item in the list to view the content details. Users may also have the option of clicking a button to view where the content would live on the site, edit the content, approve the content to pass it on to the next reviewer or approve the content for publishing.

The product also supports the delegation of user management to partner agencies, obviating the need for a central administrator at SBA to manage all contributor entitlements.

Another standard feature includes the ability for the Content Manager to receive an e-mail alert whenever there is something in the system that needs their review/approval. The Content Manager would then log in to view a log of pending items in the workflow and a record of that content object. For example the Content Manager will be able to view information about who created the content, who has approved it up to this point and any changes made to the original content file.

Once the content object has been reviewed and approved, the Content Manager can then click a button to publish the content or edit to the live server. Also, dependent on the

content type, it is possible to have an automatic publishing process. For example a workflow could be established that would enable a content contributor to submit a pre-approved press release that would then trigger an automatic update to the site without review. This feature would free up the Content Managers to focus efforts on content that requires more editorial control.

Required Customization

Workflows are built into the functionality of Stellent v7.5, but need to be customized to meet the specific needs of the Business Gateway. The Governance Board will need to define the workflow process for each content type (press release, links, articles, etc). Once those are defined, they will be added to the system configuration.

Another feature of v7.5 that requires customization is the ability to create collaborative workflows. Online discussion boards and e-mail listservs can be configured to allow Content Managers and Contributors to share documents in progress and review edits before content is moved into the production workflow. There is no way to insert comments or electronic "stickie notes" directly into the content itself.

Workflow can theoretically be customized to be a two-way communications tool. The standard workflow is based on a Contributor creating content then passing it on to a Content Manager for review/approval. With some customization, v7.5 could be configured to allow the reverse process where a Content Manager identifies a content need then triggers a workflow prompting one or more Contributors to respond. This will require customization. Stellent's workflow is content-based rather than task-based, so managers cannot assign tasks without a content payload the way the system ships natively. Extensions would have to be written to essentially have assigning managers create empty content items to be tasked to individual contributors. Additional programming would be required to create multiple similar or identical tasks for multiple contributors.

There are many alternatives for packaging and approving content objects under this scenario, and the business processes here beg more thought and experimentation. For example the CM could send a workflow to ten Contributors, but choose not to publish then content until responses have been aggregated from all ten sources. Similarly, custom scripts could enable the system to allow the Content Manager to designate a response time for multiple contributors then publish either when all responses have been aggregated or the deadline has passed, but to do this requires additional programming that is not part of the standard package.

Other Considerations

Like most advanced content management tools, Stellent provides 2 publishing paradigms:

- Dynamic: content is retrieved from the repository at the time a visitor clicks on a link. Custom code is used to grab the content and render the page "on the fly."
Stellent can do this in two ways:
 - Serving as a dynamic delivery system itself ("poor man's portal")
 - Feeding content to a dynamic portal server

In both cases, Stellent licenses must be procured and software installed in the visitor-facing, or "delivery" environment.

- Static: content is pregenerated into static HTML from the items in the content repository. Those HTML files are pushed to a simple webserver in the delivery tier. This is how FirstGov presently works, as well as the Business Gateway Atomz implementation. The advantage to this approach is that it is simple, inexpensive, and reliable. A disadvantage is that this "baking" process takes time. Depending on the number of pages changed in any one time, the publishing cycle can take 10 minutes to several hours (if a core component like a footer is changed and all pages need to be regenerated). The other disadvantage is that it does not allow for true personalization, although the system can pre-generate customized versions of pages for different browsers and other environmental variables.

3.3 Creating Pages from Pre-defined Templates

Use Case

When the system is implemented, it will be configured with a set of standard design templates. Each template will support one or more content types. The template will enforce design standards and provide a consistent user experience.

The system, however, needs to be scalable, so that as the Business Gateway evolves, templates can be modified or new templates can be built and added to the CMS without involving custom programming.

Out of the Box Functionality

In addition to the core Stellent "Content Server" repository, there is the option to license modules that allow for the creation and publishing of pages. The three options -- which are not mutually exclusive -- include: CM publisher (drops files into a template then publishes them), Site Studio (creates web pages using a template) and the Site Studio Publisher (bakes pages and puts them on the web server)

The ability to create new "container pages" or templates requires the implementation of the Stellent Site Studio module. This application give designers the ability to grab an existing template and make modifications by pulling XML server-side includes (or "fragments") out of the library.

Required Customization

Stellent has a clean approach to template development that should be relatively easy to manage without custom scripting. However, any graphic designer or page designer will have to undergo special Stellent training to build and configure the templates, and may need to avail themselves to a developer from time to time to add custom elements.

4 Other Requirements

In addition to the Use Cases above, Stellent was evaluated against more general business and technical requirements. These requirements were collected in multiple categories. Those

categories and the details of the measurement of Stellent against those requirements are detailed below.

4.1 508 Compliance

Overall:	Met Requirements
Considerations:	<p>Stellent was able to demonstrate 508 compliance in the key areas of concern: 1. The ability to write 508 compliant web content; and, 2. The ability to provide 508 compliant user interfaces to the WCM user.</p> <p>Although #1 was not rigorously tested, the product does not natively require HTML code that would violate the 508 specification. Ultimately, the best guarantee of compliant output is to make sure that all templates are compliant, and that certain features (e.g. table generator) are turned off in any rich text editor. It remains theoretically possible for authors to copy-paste non-compliant HTML code into the system, and like most CMS products, Stellent has no native facility to check for compliance upon publishing.</p> <p>With respect to the contributor interface, Stellent ships with multiple user interfaces, including one that is 508 compliant.</p> <p>Business Gateway WCM user interface customization requirements for the content contributor user interfaces may impact 508 compliance of the WCM interfaces. Business Gateway should monitor the design specifications and be sure to enquire in this area if 508 compliance of user interfaces is a high priority</p>

4.2 Page Publishing

Overall:	Met Requirement, with caveats.
Considerations:	<p>On the whole Stellent met the content aggregation requirements for the Business Gateway. The product can pre-generate static HTML. It also provides a very nice dependency reporting framework so that authors can understand the impact of the changes they make across multiple pages where a content item appears.</p> <p>Stellent can also serve up content dynamically from its repository. It's only shortcoming here is not trivial: as an architectural matter, Stellent urges licensees to physically bundle Stellent installations with any Portal product in the delivery environment -- unlike most CMS tools, which allow the CMS to work solely behind the scenes. This has cost and complexity implications if and when Business Gateway migrates to a</p>

	formal Portal environment.
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4.3 Content Contribution and Editing

Overall:	Met Requirements
Considerations:	<p>Stellent met these requirements on the whole with a few caveats. The interface for the <i>creation</i> of editorial and approval forms was a little technical for business users.</p> <p>To the extent that the interface has not been tested by all-important end-users across multiple agencies, any conclusions we reach here must be considered contingent at best.</p>

4.4 Content Management

Overall:	Met Requirements
Considerations:	<p>Stellent showed that it could manage all content types. It can support content in multiple states (draft, work-in-progress, live, broken, retired, suspended, archived, expired, etc.).</p> <p>The subject of content re-use was a key topic of discuss. Many different scenarios were discussed regarding what type and depth of customizations would be required in order to reuse link objects on pages and to allow content objects and page instances to gravitate towards one and other based upon assigned metadata values. It appears that a customized solution could be crafted but the correct approach would include the creation more detailed information architecture specifications for the Business Gateway.</p> <p>Another customization required would be an automate way to check for hyperlink integrity. The Business Gateway team was unclear about the rate of broken links on the web site. Due to the changeable nature of the content on cross agency portals, we would recommend a customization which would allow for scheduled link checking and some capacity to help the content management manage the repair of those links by assigning (either manually or through automation) these tasks to the distributed content contributors.</p>

4.5 Infrastructure

Overall:	Pending
Considerations:	<p>Currently, there is some lack of clarity regarding the technical infrastructure within which the Business Gateway content management system would reside. Once these infrastructure issues are clarified, further analysis should be conducted to ensure that Stellant is a good fit</p>

	for the infrastructure. Our belief is that, due to the many successful implementations of Stellent in the federal arena, an appropriate architectural and infrastructure solution can be managed.
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4.6 Localization

Overall:	Met Requirements, with caveats
Considerations:	Stellent supports multilingual publishing. However, it is not clear how the product natively associates localized and source content. As this is not a high priority for the Business Gateway at this time, we felt that this lack of functionality was not a show stopper

4.7 Metadata Management

Overall:	Customization required
Considerations:	<p>Stellent had difficulty meeting the metadata application and management requirements out of the box:</p> <p>The functionality for the application of metadata to content seemed to be mostly suitable. Missing was the ability to handle nested taxonomies as metadata values. Discussion revealed that some customization would help to rectify this lack of functionality.</p> <p>The largest area of deficit was in the area of taxonomy management. Stellent does not provide a browser-based mechanism for managing (adding to, deleting from, modifying) the taxonomy which is used to manage content objects. Values must be modified by a developer or someone trained in the system.</p> <p>Stellent seemed confident that these problems could be resolved with customization and referenced a few clients for which they had created similar functionality.</p> <p>As the CMS solution proposed is driven by the application of metadata to content objects, the Business Gateway team should be sure to understand in detail, how the metadata management issues will be resolved (technically) and perhaps request a prototype, prior to making their final assessment regarding the viability of Stellent for the Business Gateway.</p>

4.8 Reporting and Search

Overall:	Met requirements, with caveats
Considerations:	Stellent offers a set of default reports on the content repository and

	<p>users. Customizing the reports requires developer intervention.</p> <p>Stellent ships with a version of Verity (the VDK) for repository search, which allows for both full-text and attribute-based search. This implementation of Verity has seen some problems in very large-scale deployments, but should be more than adequate for Business Gateway.</p> <p>Reporting (for the CMS repository) functionality was not explicitly tested but as there are not explicit strong requirements for reporting, we feel that Stellant's out of the box reporting functionality will be adequate. The Business Gateway team should explore alternative reporting solutions for the reporting of content use (for instance, click path, "hits", etc.) in the web content delivery environment.</p>
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4.9 Scalability

Overall:	Meets Requirements
Considerations:	Stellent can easily support the WCM user and content base for the Business Gateway.

4.10 Security

Overall:	Meets Requirements
Considerations:	<p>Stellent meets all of the WCM security requirements for the Business Gateway</p> <p>It is worth noting that Stellant would have difficulty managing user specific permissions. For instance, if we wanted to create a unique set of permissions for "User A" we would have to first create a <i>group</i> which had these permissions and the place "user A" in that group. This is common to most CMS packages. In demonstration, the Business Gateway team did not think that this would be a problem.</p>

4.11 Software Administration

Overall:	Meets requirements
Considerations:	Stellent is administered through a combination of web browser and applet-based client and IDE for developers.

4.12 System Integration/Interoperability

Overall:	Not tested
Considerations:	This deeper functionality was not demonstrated in our one day session; however, Stellant has an attractive extensibility framework that allows for

	custom Java objects to be created. Developers must learn the proprietary "iDoc" scripting language.
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4.13 Templates/Presentation

Overall:	See Use Case 3 Above
Considerations:	

4.14 Training & Support

Overall:	Not Tested
Considerations:	Stellent appears to offer adequate training for non-technical users, administrators and systems developers.

4.15 User Role Management

Overall:	Meets requirements
Considerations:	Stellent allows for distributed user management, which will be highly effective for Business Gateway.

4.16 Workflow Management

Overall:	Meets requirements, with caveats
Considerations:	<p>Stellent offers a robust-enough workflow for BG needs. The task inbox and other workflow interfaces can be relatively easily customized by a junior developer.</p> <p>Stellent does not natively support task-based workflows. Adding the ability for a manager to assign tasks to an individual or group of contributors will require customization. In order to control implementation costs, the Business Gateway team should take special care to understand the extent to which they plan to assign tasks to content contributors and manage the execution of those tasks within the content management system.</p>

5 Concluding Recommendations

Based on our brief demonstrations, we believe that Stellent generally meets the Business Gateway requirements, with a reasonably normal amount of customization, except for one major caveat concerning personalization.

If Business Gateway is considering moving to a completely personalized experience within the next two years, Stellent may be sub-optimal, inasmuch as today the product does not have comparatively advanced capabilities to integrate with portal solutions, and moreover

the company urges licensees to install the CMS in the delivery environment alongside any portal -- causing a substantial increase in cost and complexity.

Hold Off on Portal Software

Our judgment is that Business Gateway presently has insufficient content to justify what would be a significant investment in personalization, and that getting its content house in order with distributed authorship is a multi-year project, over which time architectural options could be revisited with Stellent. Moreover, we feel that the Business Gateway core content team should attempt to address the needs of the Gateway users through revision of its existing information architecture. Many of the content delivery problems which were expressed in the Business Gateway user focus groups conducted earlier this year can be addressed through the creation of a more appropriate site information architecture. The creation and deployment this new architecture will also help the Business Gateway determine if the expense of deploying portal software (which will be expensive) is warranted at this time. The deployment of portal software, we feel, should be executed only when the special features of portal software (single sign-on, one-to-one personalization, etc.) are explicitly required by the user base. As well, from our vantage point, it is unclear that the full Business Gateway content authoring process is mature enough to provide the customized content required for such discreet personalization.

Of course, the maturity of the Business Gateway program and content delivery models will mature over time---as will the supporting technology platform. At this time, though, we feel that the deployment of a more robust content management solution and the true distribution of content maintenance for the Business Gateway is a large enough implementation step and contains enough "wins" to justify the cost of a new web content management software deployment. It is not clear that the adoption of portal software carries the same success story. Therefore we recommend that the Business Gateway team re-architect the static web pages of the Gateway and reevaluate the need for portal software after receiving quantitative feed back from their user community.

Create a Prototype

Our core recommendation is that SBA engage Stellent to construct a simple prototype solution that could be tested by key contributors from a variety of partner agencies. We believe Stellent would be highly motivated to work with SBA for the chance to establish a model content management system for interagency portals across the federal government more broadly.

The purpose of the prototype would be to:

- Test Stellent's usability with actual contributors. If contributors find the system less-than-usable, they won't adopt it.
- Test the quality of Stellent's professional services team. This was the key failing of the FirstGov project and the reason why it was significantly delayed and over-budget -- Vignette could not deliver the right team.
- Test assumptions about information architecture.
- Critically, test the validity of inputting "placeless" links that appear on pages due to metadata attributes. If contributors will not apply metadata, or if they classify the links incorrectly, the links won't appear on the right pages. Ultimately, this is about

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- working out a suitable division of labor between Business Gateway staff and participating agencies, as well as training the latter in the overall information model.
- Enable the development of a realistic migration plan.
 - Enable Stellant to provide an accurate quote on the final build-out.

6 Aligning with Firstgov/Vignette

Many of the Business Gateway web content management requirements are identical to the web content management system requirements for the FirstGov portal. In keeping with the spirit of the Federal E-Gov initiatives, it is reasonable to consider to what extent the Business Gateway team ought to consider utilizing the already established FirstGov web content management infrastructure. Below are a list of benefits and drawbacks to “piggy-backing” on top of the FirstGov Vignette implementation.

These are qualitative observations based on our personal experience with the Vignette implementation (which is in some cases 2-3 years old). If the Business Gateway team intends to seriously consider utilizing the FirstGov infrastructure, they ought to conduct similar proto-typing and testing exercises as described above for Stellent. *The list below should not be used to make a final judgment in this area.*

Benefits of using Vignette

- Firstgov.gov and The Business Gateway have similar functional and technical requirements. BG requirements are fundamentally a subset of FirstGov CMS needs.
- Forms.gov is already utilizing BEA as a delivery system within the FirstGov hosting environment (although FirstGov does not use BEA—currently, FirstGov content is baked out of Vignette as static pages)
- Sharing technology tools aligns with E-Gov philosophy. Co-managing FirstGov and the Business Gateway may be an opportunity to establish and promote government-wide standards for managing cross-agency portals.
- The FirstGov Vignette solution is already up and running. It may be easier to create a prototype in this environment.
- There may be opportunities to align more deeply the taxonomies of the two sites and therefore deepen the possibly of automated content sharing and content integration.

Drawbacks of using Vignette:

- The Vignette product was significantly extended for the FirstGov implementation. This may lead to software upgrade challenges in the future. Customizations and extensions to Vignette likely exceed prospective customizations to the current version of Stellent required by Business Gateway. Vignette professional services will likely want to re-architect the implementation before extending it as a model for other interagency portals, which could erode any cost advantage.
- User interfaces and general flow were designed for FirstGov "power users" and will require modification for more casual contributors.
- Again, the devil is in the details. While the superficial requirements for the Business Gateway appear to have deep synergies with those of Firstgov, the program offices and intentions of these sites are very different. As, each of these site mature, the requirements for both content authoring and content delivery may diverge in significant ways.

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- It's not clear the programmatic support mechanisms required to share the Firstgov infrastructure are put into place or, if in place, mature. To some extent the Business Gateway implementation would be the web content management Guinea pig.